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EDITOR: KAI SIEGBAHN - UPPSALA

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Second Revised Edition

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by JOHN M. COWLEY, *Arizona State University, Tempe, Arizona, U.S.A*

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This book provides a unifying treatment for all branches of diffraction based on the elementary mathematical descriptions of physical optics and wave mechanics, demonstrating how the peculiarities of the various techniques arise from the particular properties of the radiations used and showing how the results of the different methods may be interrelated. There is an emphasis on the use of electrons which may aid the research worker concerned with X-rays and neutrons to appreciate the nature of the electron diffraction results more fully, and may provide a better background for electron microscopists and diffractionists. The kinematical and dynamical theories of diffraction are derived from the elementary ideas of physical optics with a gradual introduction of the Fourier transform as the basic mathematical tool. The development allows a general treatment, not immediately specialized for periodic objects, which permits an easy understanding of diffraction by disordered and imperfect crystals. This book is especially appropriate for students who have previously taken a course in X-ray diffraction or electron microscopy and will be useful to experienced workers engaged in the development of techniques or in applications to any of the diverse fields of biological or materials science.

In this revised edition, short additional sections have been added on the subjects of coherence and modulated structures. Several sections have been updated and a number of references to recent work have been added.

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